OCEAN GALES AND STORMS, JUNE, 1931

Vessel	Voyage		Position at time of lowest barometer		Gale began	Time of lowest barometer	Gale ended	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Highest force of wind and direction	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN			° ′	° ′				*Inches*					
Aracataca, Br. S. S.	Rotterdam	Tela, Honduras.	39 16 N	32 20 W	June 1	Noon 2	June 3	29.63	SSW	SSW, 9	NW	SSW, 9	SSW-NW.
Ogontz, Am. S. S.	Pasajes, Spain.	New Orleans.	35 20 N	38 40 W	June 6	Mdt. 6	June 7	29.75	SW	W, 6	W	W, 8	SW-W-WNW.
Cripple Creek, Am. S. S.	New Orleans.	Liverpool	38 47 N	64 42 W	June 9	2 p. 9	June 9	29.48	E	E, 10	S	E, 10	E-SE-S.
Marie Leonhardt, Ger. S. S.	New York	London	40 33 N	60 23 W	do	— 9	do	29.88	E	E, 9	E	E, 9	Steady.
Berlin, Ger. S. S.	Bremerhaven	New York	48 43 N	22 15 W	June 14	Mdt. 14	June 15	29.31	SSW	SSW, 10	NW	SSW, 10	SSW-W.
Nieuw Amsterdam, Du. S. S.	Rotterdam	do	50 43 N	15 03 W	June 15	8 a. 15	do	29.47	SSW	SSW, 8	WSW	SSW, 8	SSW-WSW.
Tulsa, Am. S. S.	Savannah	Liverpool	39 49 N	53 38 W	June 21	2 a. 21	June 21	29.72	SSW	SSW, 8	SSW	SSW, 8	Steady.
Choluteca, Hond. S. S.	Baltimore	Tela, Honduras.	20 32 N	85 38 W	June 25	7 a. 25	June 25	29.59	E	SE, 6	SE	SE, 8	
Okeania, Gr. S. S.	do	Lisbon	39 54 N	51 12 W	June 24	Noon 25	do	30.02	SSW	SW, 6	NW	SW, 8	S-SW.
San Tirso, Br. S. S.	Minatitlan	Manchester	40 25 N	55 14 W	June 27	3 p. 28	June 28	29.71	WSW	S, 6	S	SSE, 8	
NORTH PACIFIC OCEAN													
Emma Alexander, Am. S. S.	San Francisco	Seattle	41 14 N	124 33 W	June 3	2 p. 3	June 3	29.98	NW	—, 8	NW	NW, 9	WNW-NW..
Iowa, Am. S. S.	Japan	San Francisco	41 48 N	157 37 E	June 4	8 p. 4	June 5	29.36	ENE	NE, 7	NW	WNW, 8	NE-N-NW.
Paris Maru, Jap. S. S.	Seattle	Yokohama	52 53 N	149 02 W	do	Mdt. 4	do	29.18	S	S, 8	SSW	S, 9	3 pts.
Granville, Pan. M. S.	Shanghai	San Pedro	45 54 N	163 30 W	June 10	8 p. 10	June 14	[1]29.54	E	E, 8	WNW	WNW, 9	
City of Elwood, Am. M. S.	do	Honolulu	31 30 N	154 08 E	June 11	5 a. 12	June 12	29.20	SE	S, —	SW	S, 8	SE-S.
Tejon, Am. S. S.	Yokohama	San Pedro	42 00 N	139 00 W	do	— 13	June 13	29.37	SE	NE, 8	W	—, 9	
Golden Tide, Am. S. S.	Hong Kong	San Francisco	34 24 N	140 16 E	June 12		June 12	29.60	ESE		S	ESE, 9	ESE-S.
Olympia, Am. S. S.	Orient	do	43 16 N	169 50 W	do	— 13	June 14	[1]29.44	E	S, 8	SW	S, 8	SE-S-SW.
City of Victoria, Can. S. S.	Japan	do	39 48 N	168 32 W	June 16	Noon 16	June 17	29.74	SE	SE, 7	SSW	—, 8	
Seattle, Am. S. S.	Celebes	do	39 15 N	157 55 W	June 22	5 a. 23	June 23	29.79	S	SW, 6	SW	SW, 8	S-SW-W.
Iowan, Am. S. S.	Los Angeles	Balboa	16 59 N	103 16 W	June 23	6 a. 23	do	29.75	SE	SE, 6	SSE	E, 8	SE-E
Blythmoor, Br. S. S.	Vancouver	Panama	19 48 N	106 29 W	June 24	10 p. 24	June 24	29.74	NW	E, 8	SE	E, 8	N-E-SE.

[1] Barometer uncorrected.

NORTH PACIFIC OCEAN

By WILLIS E. HURD

Atmospheric pressure.—During June, 1931, the Aleutian LOW was slightly deeper than normal for the month, especially to the westward of the peninsula of Alaska, where also the pressure was lower than in the previous month, thus showing an early summer intensification. On the average a distinct center of 29.81 inches barometer extended from the Gulf of Alaska westward to beyond Dutch Harbor. During strongest developments of the LOW the barometer fell to a minimum of 29.10 inches at Kodiak on the 5th, and to 29.02 at Dutch Harbor on the 15th.

The North Pacific HIGH covered an extensive area in middle latitudes over the eastern half of the ocean throughout the month, its eastern extremity lying along the coast of the United States except on five or six days, when the northern LOW intervened by extending unusually far southward. Over the western part of the ocean in these latitudes pressure was fluctuating and unstable.

The following table gives barometric data for several island and coast stations in west longitudes, including Point Barrow on the Arctic Ocean:

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, at indicated hours, North Pacific Ocean and adjacent waters, June, 1931*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	*Inch*	*Inches*		*Inches*	
Point Barrow [1] [2]	29.99	0.00	30.20	8th [3]	29.74	11th.
Dutch Harbor [1]	29.81	−0.09	30.26	13th	29.02	15th.
St. Paul [1]	29.88	+0.02	30.30	13th	29.12	15th.
Kodiak [1]	29.81	−0.10	30.16	1st [3]	29.10	5th.
Midway Island [1]	30.04	−0.01	30.16	19th [3]	29.74	3d.
Honolulu [4]	30.06	+0.02	30.15	17th	29.93	6th.
Juneau [4]	29.93	−0.08	30.32	3d	29.48	21st.
Tatoosh Island [4] [5]	29.99	−0.06	30.25	4th	29.73	25th.
San Francisco [4] [5]	29.96	0.00	30.11	16th	29.81	4th.
San Diego [4] [5]	29.92	+0.03	30.03	15th	29.74	22d.

[1] P. m. observations only used in averages; a. m. and p. m. in extremes.
[2] For 29 days.
[3] And on other date or dates.
[4] A. m. and p. m. observations.
[5] Corrected to 24-hour mean.

Depressions and gales.—June witnessed comparatively quiet weather over the entire North Pacific, with an absence of tropical storms, as well as of gales exceeding 9 in force, so far as now indicated by reports.

In east longitudes, particularly toward the Asiatic coast, numerous tropical and extratropical depressions gathered, those in lower waters dissipating or moving out of the field without much show of energy. In the Japanese area only one cyclone of the month is indicated as displaying marked strength. This skirted the lower coast of Japan and caused gales of force 8 to 9 on the 12th from Kiushu Island to southeastern Honshu.

A depression lying north of Midway Island on June 1 moved into the Aleutian region on the 2d, and thence into the Gulf of Alaska on the 4th and 5th, where isolated southerly gales of force 9 were reported near 53° N., 148° W., during the time of greatest intensification of cyclonic energy over the northeastern part of the ocean for the month.

From the 11th to 14th a series of gales of force 8 to 9 was encountered along the northern routes between about latitudes 40° and 50° N., longitudes 135° and 170° W. These were caused by two depressions, the more easterly of which lay south of the Gulf of Alaska for two or three days, becoming more and more restricted in area until, as a small LOW, it entered the Washington-Oregon coast on the 15th. The other depression entered the Aleutian area from the southwest on the 13th, causing fresh gales along its eastern boundary on that date. By the 15th, then central in the southern part of the Bering Sea, it acquired considerable depth, giving the lowest pressure of the month over the central Aleutians, and a reported gale of force 9 from the west nearly south of Atka Island.

On the 3d and 4th of the month there was a strong northwesterly air current off the American coast between Tatoosh Island and Eureka, blowing along the eastern edge of the HIGH and rising in force at times to that of a fresh to strong gale.

In the Mexican coast region, during the prevalence of slight depressions over lower and upper Mexico, a fresh

easterly gale was experienced on the 23d off Acapulco, a moderate gale in the Gulf of Tehuantepec on the 24th, and a fresh easterly gale on the same date off central Lower California. Aside from these, no gales were reported from the entire ocean south of the thirtieth parallel.

Winds at Honolulu.—While there were some southerly winds at Honolulu early in June, due to the depression then west and northwest of the Hawaiian Islands, the prevailing direction for the month was east, with the maximum velocity, 24 miles from the east, on the 22d.

Fog.—In the average year fog increases greatly in frequency and extent over the upper waters of the North Pacific, especially along the western part of the routes, during June. This year the June percentage of fog was slightly less than in the previous May over the region of the summer fog bank lying east and southeast of the Kuril Islands, except in the 5° square, 43° to 48° N., 155° to 160° E., where it occurred on 10 days, or with about its frequency in the previous month. Along the middle part of the upper routes the occurrence was light, but south of the Gulf of Alaska, from longitude 150° W. to the coast, it was encountered on three to five days in each 5° square. The heaviest coastal occurrence was between Eureka and San Diego, where it was reported on nine days. Farther southward it was met with occasionally to Cape San Lucas. In mid-ocean, between 30° and 35° N., 165° E. to 165° W., fog was unusually frequent, forming here and there along the strip from the 17th to the 27th.

Volcanic phenomena.—The British steamer *Narenta* was in port of San Jose de Guatemala during the day of June 5. Mr. C. K. Brown, third officer of the vessel, on this day reported: "Volcano Isalco in eruption. Lava flowing freely down side like a waterfall. Visible at 50 miles through rain."

Mr. F. E. Holmes, observer on the American steamer *Victoria*, reported in June (date not given, but between the 8th and the 26th): "While laying at the dock at False Pass, Alaska, latitude 54° 51′ N., longitude 163° 22′ W., noted some fine brown sand or lava falling, evidently from Volcano Shishaldin."

BUCKET OBSERVATIONS OF SEA-SURFACE TEMPERATURES

By GILES SLOCUM

STRAITS OF FLORIDA AND CARIBBEAN SEA

The temperatures herein published are the means of the average temperatures for the four quarters of the month, except that, in the case of the 5° subdivisions of the Caribbean Sea, the figures shown are the simple means of the observed temperatures with the entire month taken as a unit. Table 1 shows the lengths of the quarters for each length of month.

Table 2 shows the average temperature for the Caribbean Sea and the Straits of Florida for June of each year from 1919 to 1930, inclusive, and Table 3 summarizes the temperature for the month in the same areas, including the departures of the June, 1930, means from the 11-year means for June, 1920–1930, and the changes from the temperatures for the preceding month of May, 1930.

The chart shows the number of observations taken during the month of June, 1930, within each 1° square; the mean temperature of the Straits of Florida, and of each 5° [1] subdivision of the Caribbean Sea; the 11-year means (1920–1930) for these areas; and the local mean time corresponding to Greenwich mean noon, at which time the mariners are instructed to make the temperature readings.

June marks the end of what may be called the cool season in the Caribbean Sea. From the 1st to about the middle of the month, under average conditions, the seasonal march of sea-surface temperatures continues to exhibit nearly as strong an upward trend as that found in May, but this rapid rise does not continue through the rest of the month. Instead, it becomes more gradual than is found in the first half of June, in the spring weeks, or in the late summer. The Straits of Florida region, hitherto cooler than the Caribbean Sea, becomes the warmer of the two areas, with the time of the reversal in relative temperature varying from early June to near the beginning of July.

In average years within the Straits of Florida, June is the month of most rapid rise in temperature during the entire year, with the 11 years' record showing no June as cool as the warmest May.

Comparing the two areas by quarter months, the Caribbean has usually been warmer than the Straits during the first quarter of June; as often the cooler as the warmer during the second quarter, although its temperature averages slightly higher for the 11 years; cooler than the Straits during the third quarter, with exceptions in 1926 and 1930; and at no time warmer during the fourth quarter, unless the doubtful case of 1919, when observations were few, be included. In the Straits of Florida the third and fourth quarters of June have thus been almost uniformly periods when the surface water was distinctly warmer there than in the Caribbean Sea, with the result that the Straits show a higher mean temperature for the month.

In June, 1930, the Caribbean Sea was somewhat cooler than average east of the seventieth meridian, close to the average in the Cuba-Jamaica region and north of the eastern Colombia coast, and warmer than the 11 year mean over the rest of the sea, with the plus departures large in Central American waters. The fourth quarter of June was cooler than the third over the region east of the seventy-fifth meridian, and in that area west of this longitude and south of the fifteenth parallel. For the fourth successive month the mean temperature of the sea as a whole was somewhat above the seasonal average.

In the Straits of Florida, June was notably an abnormal month. The observational readings for the first and fourth quarters gave computed mean temperatures well below the usual values, while those for the second and third quarters and for the month as a whole averaged the lowest for these periods since records began.

This coolest June in the Straits area followed a month with sea-surface temperatures, within the range of statistical possible error arising from limited size of samples, as high as in any preceding May, the difference between these two months in 1930 being only 0.8°. The smallness of this May-to-June range in temperature constitutes another record without precedent or near approach. The anomaly of this near approach to equality between the two monthly temperatures becomes increasingly manifest when the 0.8° difference is contrasted with the mean range of 2.9° between May and June for the 10-year period of 1920 to 1929.

No theory is offered in explanation for, or in support of, a cause-and-effect relation between the cool water in June in the Straits of Florida and the 1930 drought. The period covered by sea-surface temperature records in workable volume includes only a few recent years, and

[1] In 3 cases, as indicated on the chart, the observations from small, little traveled, and unimportant areas at the outer limits of the Caribbean Sea have been treated as parts of contiguous 5° subdivisions.